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Tool Stock and Availability

Please contact your distributor for the orderable part number for this device.

Introduction

E10A-USB is a low-cost on-chip emulation solution from Renesas.

Previous E10A solutions have been based on either PCI or PCMCIA and were ded
particular device.
E10A-USB works differently in that one hardware can support any H-UDI or H-AUD capable device.

You can select which device family the E10A-USB will support at installation. This is a On
Time Process (OTP). The E10A-USB can be programmed to support additional device
with a low-cost software upgrade available from Renesas Development Tool supplie
means that only one hardware purchase is necessary, thus reducing the cost of de
Renesas devices now and in the future.

E10A-USB is supplied as a handy box with debugging software and a connection c

Product Structure

The E10A-USB is supplied with the capability to install one Device Group, an additic
purchase of one or more Device Group Addition(s) enables the same E10A-USB to support
devices from other Device Groups. Please view the Installation and Device Group
pages for further details.
E10A-USB emulator is connected to the user system via the exclusive debug interfa
UDI*2 and AUD*3). That enables to debug in such an environment that is about equal to the
actual. Using personal computer (IBM PC compatible) with USB 1.1/2.0 (Full-Speed) as a ho
computer, E10A-USB emulator can debug not only in laboratory but also fields and a

*1: E10A-USB emulator is not support all the microcomputers which has the exclus
interface (H-UDI and AUD).Please refer to the Target devices list.
*2: The H-UDI (User Debugging Interface) is an interface compatible with the Joint
Group (JTAG) specifications.
*3: The AUD (Advanced User Debugger) is one of the emulator functions. The AUD
Branch trace function and RAM monitoring function. As the emulator function depe
emulator, please refer to the emulator manual to see if the emulator has the AUD f

Product Lineup

Product Name	Components		
	Hardware		Software
HS0005KCU01H	E10A-USB (Without AUD function)	14-way cable	E10A-USB software (1 license of device group additions included)
HS0005KCU11H *	E10A-USB (Without AUD function)	14-way cable	E10A-USB software Automatically configu to support all H8S, H8SX and SH microcontroller devic
HS0005KCU02H	E10A-USB (with AUD functio	14-way cable 36-way cable	E10A-USB software (1 license of device group additions included)
HS0005KCU04H (For the SuperH RIS engine Family of mu core MCUs)	E10A-USB (with AUD functio	14-way cable 38-way cable	E10A-USB software

* The '11H E10A-USB does not require device group addtions, it does not support S
SH4 microprocessor devices.

E10A-USB Device Group Additions (License Tool for Device Group Additions does
not apply to HS0005KCU11H)

If a user wishes to add a second, or third or subsequent Device Group to an existing E10A-USB
product to enable the unit to support those groups in addition to the original selecte
installation then the user has the opportunity to purchase these Device Group Addi

Notes:

- It is NOT necessary to purchase a device group addition if the user only wish devices from one group. In this case the user should select this group as the at the first installation of the E10A-USB product.
- Device group Additions can be purchased from your Renesas supplier or dist ordering the appropriate part number from the table below and are delivered ROM.
- If a user has purchased a Device Group Addition or selected a Device Group installation then there is no need to purchase a new Device Group Addition to devices within the same Device group if they are released at a later date, upo can be downloaded from the Download site or requested from your Tools Pro Support team.

Part numbers of the license tools

Device group	Part number	Description
H8S	HS2339KCU01SR	H8S device group addition
H8SX	HS1527KCU01SR	H8SX device group addition
SH-2	HS7047KCU01SR	SH-2 device group addition
SH-2A	HS7206KCU01SR	SH-2A device group addition
SH-3	HS7729KCU01SR	SH-3 device group addition
SH-Mobile	HS7290KCU01SR	SH-Mobile device group addition
New_SH-Mobile	HS7318KCU01SR	New_SH-Mobile device group addition
SH-4	HS7751KCU01SR	SH-4 device group addition
SH-4A	HS7780KCU01SR	SH-4A device group addition

Further notes:

- If the user possesses more than one E10A-USB to add Device Groups to, then the should purchase an equivalent number of device Group Additions. Once purc for one E10A-USB product.
- Refer to the other pages in this section for more details on the configuration USB, Initial Installation and the latest information on supported devices.
- For further details please contact your Renesas supplier or distributor.

Lineup:

HS0005KCU11H

E10A-USB LITE- Automatic support for all H8S, H8SX and SH2 microcontrollers wi
UDI interface. Does not support SH2, SH3 or SH4 microprocessors.

HS0005KCU01H

E10A-USB emulator not supporting AUD trace function.

HS0005KCU02H

E10A-USB emulator supporting AUD trace function.

HS0005KCU04H

E10A-USB emulator for the SuperH RISC engine Family of multi-core microcontrollers supporting the synchronizing debugging function.

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Components

- Emulator main unit
- USB interface cable
- User interface cable
- Software (CD-ROM)
  - High-performance Embedded Workshop
  - Emulator debugger for E10A-USB

* The software mentioned above may not be the latest versi
according to the shipping time. Please upgrade your softwa
more recent version here

* HS0005KCU01H includes one user interface cable (14-way cable
for H-UDI connection).

* HS0005KCU02H includes two user interface cables (one 14-way
cable for H-UDI connection and one 36-way cable for AUD
support).

* HS0005KCU04H includes two user interface cables (one 14-way
cable for H-UDI connection and one 38-way cable for AUD
support).

* The connector to user system is not included.

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Debug MCU Board for SuperH Family

[Overview]

"Debug MCU board" is an optional board to use the E10A-USB on-chip debugging
emulator under the circumstance of developing systems employing MCUs witho
debugging interface (H-UDI) function nor AUD (Advanced User Debugger) function
enables the E10A-USB emulator to work as a simple in-circuit emulator, which leads us
to the effective development.
The available debugging functions are as follows: executing the program, gener
viewing or changing the memory content, measuring performance, acquiring a t
on.
In addition, users can use all pins of the MCU (the emulator does not occupy ar
MCU).

[System Configuration]

[Specifications]

Supported MCU	SuperH RISC engine Family - SH7125 Series SH7124, SH7125 Group - SH7147 Series SH7147 Group (SH7147, SH7142)
Power supply to Debug MCU board	The following two ways of powering are available. (1) To supply via the Vcc terminal on the target board. (300mA) (2) To supply externally via the power terminal on the D MCU board. (5V)
Connection to target system	Plug into the IC socket on the target board.
Connection to E10A-USB emulator	H-UDI (without AUD) : 14-pin H-UDI (with AUD) : 36-pin
External dimension	Body : 80mm×85mm Cable : 150mm (flexible cable) Cable head : 40mm×35mm
Bundled Accessory	Applicable IC Socket for MCU package (qty.1)

[Features in using with Debug MCU board]

--- Comparison (1) ---

When you use ;		only E10A-USB emulator*1	E10A-USB emulator + Debug MCU board
Connection to use board		H-UDI port connector	IC socket
H-UDI terminals		Used exclusively by emulat	All the user-pin functions are available.
Trace function	Built-in trace	Available (4 branches)	Available (1024 cycles)
	AUD trace	Unavailable	Available (16K branches) When using HS0005KCU02H (E10A-USB with AUD trace function).
Performance measurement function		Unavailable	Available

Note: 1. The architecture of only E10A-USB is NOT available for SH7147 Se

--- Comparison (2) ---

When you use ;		E200F emulator (with EVA-chip unit)	E10A-USB emulator + Debug MCU board
Connection to use board		IC socket	IC socket
H-UDI terminals		All the user-pin functions are available.	All the user-pin functions are available.
Break function	S/W break	1000 points	255 points
	Onchip break	10 points	10 points
	AUD break	8 points	Unavailable
Trace function	Built-in trace	Available (1024 cycles)	Available (1024 cycles)
	AUD trace	Available (256K cycles)	Available (16K branches) When using HS0005KCU02H (E10A-USB with AUD trace function).
Performance measurement funct		Available	Available
Realtime profile function		Available	Unavailable
C0 coverage measurement		Available	Unavailable

[Product part number]

Series	Group	E10A-USB (HS0005KCU02H) + Debug MCU board*1	Debug MCU board
SH7147	SH7147 (SH7142)	**HS7147EDB01H-E1** (PLQP0100KB-A (FP-100UV))	**HS7147EDB01H** (PLQP0100KB-A (FP-100UV))
SH7125	SH7124	**HS7124EDB01H-E1** (PLQP0048JA-A (FP-48FV))	**HS7124EDB01H** (PLQP0048JA-A (FP-48FV))
		HS7124EDB02H-E1 (PVQN0052LE-A)	**HS7124EDB02H** (PVQN0052LE-A)
	SH7125	**HS7125EDB01H-E1** (PLQP0064KB-A (FP-64KV))	**HS7125EDB01H** (PLQP0064KB-A (FP-64KV))
		HS7125EDB02H-E1 (PRQP0064GB-A (FP-64AV))	**HS7125EDB02H** (PRQP0064GB-A (FP-64AV))
		HS7125EDB03H-E1 (PVQN0064LB-A (TNP-64BV))	**HS7125EDB03H** (PVQN0064LB-A (TNP-64BV))

Note: *1. We provide the package deal of an E10A-USB emulator and a Debug MCU
board at a less expensive price than the sum of them separately. To get a quota
the Renesas distributor in your area.

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>> Initial Purchase Licence

The E10A-USB is supplied with the entitlement to install any
the available Device Groups on a one-time only (OTP) basis using
the Installation CD (e.g. SH-Device Group). Users should ens
they pick the correct device group to install. Please refer to
supported devices.

Note:

Once the installation has taken place the E10A USB will sup
devices in that group only, unless a Device Group Additions
purchased. To add further device groups, the user can purc
Device Group Additions software (Licence Tool for Device G
Additions) for the required Group.
If a new device which is included in the device group you in
your E10A-USB is released, downloading the latest emulator
software will add the new device to your E10A-USB.
Periodically new devices will be added to device groups, if a E10A-
USB is programmed to support SH-3 for instance and a new SH-3
device is added to the list of devices supported by E10A-USB
Renesas will make available a patch to update the E10A-USB free c
charge.

>> Subsequent Purchase Licence

If the user subsequently wishes to upgrade their E10A-USB
support an additional device group Device Group Additions (Lice
Tool for Device Group Additions) are available as additional
purchases (subject to release schedule). The Device Additic
supplied as a CD-ROM with the desired Group software. This
used in conjunction with the original E10A-USB unit.

Note:

It is possible for one E10A-USB unit to support ALL of these
devices groups if all of the Device Group Additions are purc
and installed.

Notes on Installation for Prospective Purchasers

You do not need to purchase a Device Group Addition (Lice
for Device Group Additions) to support the first device group
E10A-USB is shipped with an installer that allows the user to
any one of them.
Our range of Device Group Additions are for adding subseq
device groups to an existing system. Refer to the Device Gr
Addition on the E10A-USB home page for further details.
Further information is available from your Renesas distribut
representative.

How to add devices

When you add subsequent device groups to E10A-USB, install
"License Tool for Device Group Additions" in your PC, and u
accordance with the procedure below.

* : Do not use "License Tool for Device Group Additions" in
device group has been set up in E10A-USB.

[Procedure]

1. Open the sliding switch cover and check that the switc (SW1) for setting the emulator is turned to "1".
2. Select [Renesas] -> [LIcense Tool for E10A-USB] -> [SHxxxx (H8S/xxxx) Device Group] from [Programs the [Start] menu. "License Tool for Device Group Ad is activated.

   [Notes]
   1. In case "----" is shown in (a), no device group is E10A-USB.
      Do not use "License Tool for Device Group Addi
   2. Use "License Tool for Device Group Additions" when "-.--.---" is shown in (b).
   3. If the following error message is displayed, the h computer is not connected to the emulator or the switch (SW1) is turned to "0". In case the setup (SW1) is turned to "0", set it to "1" and connect USB cable again.

3. Click the [Setup] button. When the following dialog b displayed, addition of a device group is completed.

   [Notes]
   1. When [Add New Hardware Wizard] is displayed select the [Search for the best driver for your de (Recommended)] radio button and then the [S a location] check box to select the path to be se for drivers. The location must be specified as < D \ DRIVERS. (< Drive > is the CD drive letter.)
   2. When using Windows® 2000 or Windows® XP, a dialo box will be displayed to show the disconnection USB. However, this is not a problem.
   3. **Do NOT turn off the host computer or discon the USB cable while setting up the emulator. the emulator may be damaged.**

After completing addition of a device group, set up E10A-USB.
For further information to set up E10A-USB, see here .

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Features

- Breakpoints
  - Hardware Breakpoints, dependent on device specification
  - 255 software breakpoints
  - User break
- Trace functions
  - 4 branch trace messages stored on device H-UDI capable devices
  - Real time branch trace with AUD capable device HS0005KCU02H only
- RAM monitor
  - The contents of a memory can be referenced an changed during program execution in real-time with AUD capable devices.
- Full source level debug
  - Support for Renesas , IAR and GNU compilers
- Host requirement
  - Windows® XP, Windows® 2000
  - PentiumR3 600MHz or greater
  - RAM 128MB or greater
  - Available hard-disk 50MB or greater
  - USB rev 1.1 port
- User I/F
  - 14-way connector (Type: 2514-6002: [3M Co., Ltd.])
  - 36-way connector (Type: DX10M-36S: [Hirose Electric Co., Ltd.])
- Unit size 97mm(L) × 65mm(W) × 22mm(H)

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Flash Memory Download Program for the E10A-USB Emulator

The E10A-USB emulator is equipped with the download function to the flash memory. The us
prepare a download program to use this function.
Download program contains the following functions.

- Download the user program to the external flash memory
- Set the PC break point in the external flash memory *
- Rewrite the external flash memory directly with the memory window *

  * : The E10A-USB emulator for SuperH Family does not support these functions.

> **Important Information**
> Before creating an Application Note available below, the operation has been
> by Renesas. However, this does not mean that the Renesas is responsible fo
> operation. Before reading the Application Note, please refer to the section of
> Function to the Flash Memory Area, in the Debugger Part of the E10A-USB emulator
> user's manual for each microcomputer family (HS0005KCU01HE). Please no
> Renesas does not offer any technical support about what is written in the follo
> documents and introduced sample programs below.

SuperH Family Flash Memory Download Program

Flash programming types	Flash memo manufacture	Target MCU	Sample Program		Further note	Application Note (preliminary version)
			Byte mode	Word mode		
CUI command type	Renesas Technology	SuperH family	Download	Download	PDF	PDF
	Intel®	SuperH family	Download	Download	PDF	
JEDEC standard command compatible type	Fujitsu®	SuperH family	-	Download	PDF	

Guide to Using the Download Program to Flash Memory for the E10A-USB Emulator
This document is a guide to practically use the Application Note introduced on the web site.
explains some points of each document introduced on the web site so that the users can wri
efficiently.
Customization of Flash Memory Download Program for E10A-USB Emulator
Points to be noted when creating the write and erase modules for writing to the flash memor
stated on the web site, is described.

H8S, H8SX Family Flash Memory Download Program

Flash programming types	Flash memory manufacturer	Target MCU	Sample Program (Word mode)	Example o file for Flas memory download*1	Further note	Applicatio Note
JEDEC commar type	Toshiba	H8S, H8SX	Download	Download	PDF	PDF
JEDEC commar type (with initializatio routine)	Toshiba	H8S, H8SX	Download	Download	PDF	
CUI command type	Renesas Technology	H8S, H8SX	Download	Download	PDF	
CUI command type (with initializatio routine)	Renesas Technology	H8S, H8SX	Download	Download	PDF	

*1 : Refer to the application note and modify settings suitable for specific of flash memory on
connection with the CPU.
* : H8S Family microcomputers except H8S_custom_SoC (2000) and H8S_custom_SoC (26
available for the Flash Memory Download Program.

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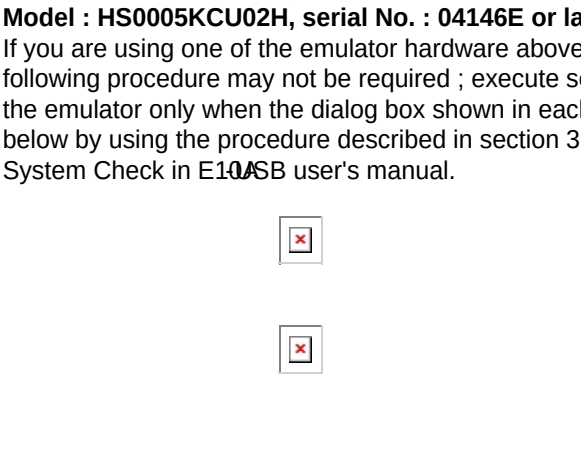
[How to install the E10A-USB emulator software]

Follow the instruction below; execute installation and setting
E10A-USB emulator.

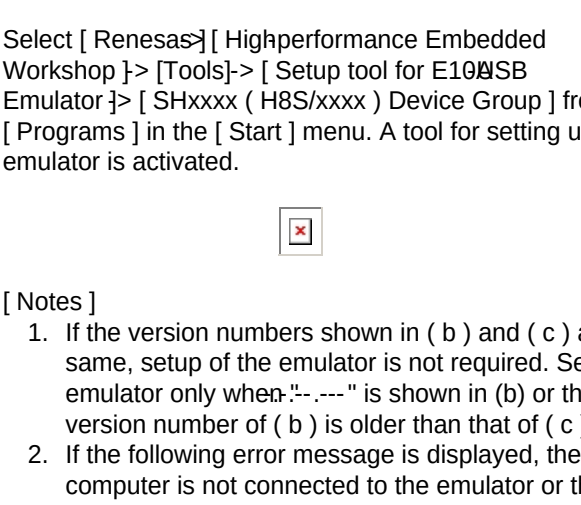
1. Execute [HewInstMan.exe] from the root directory of CD-R bundled with the E10A-USB emulator.
2. Select a device group on the [Select Device Group] s You can easily select a device group by taking the foll procedure.

   2-1. Select [Search device name...], and input a tar device name. Then, click [Next] button.



   * When inputting SH7047F, input as [SH7047F]. (Never forget "F")
   * When inputting H8S/2339EF, input as [H8S/2339F].
   * When inputting SH7705, input as [SH7705].

   2-2. Confirmation screen will open. Be sure that the t device name is indicated on the list of the support dev Then, click [Next] button.



[How to set up the E10A-USB emulator]

When using E10A-USB for the first time, set the licence which
applicable to your device group in accordance with the proc
below.

Notes before setting :

- **Model : HS0005KCU01H, serial No. : 03311C or late**
- **Model : HS0005KCU02H, serial No. : 04146E or late**
  If you are using one of the emulator hardware above, following procedure may not be required ; execute set the emulator only when the dialog box shown in each below by using the procedure described in section 3.1 System Check in E10A-USB user's manual.

[Procedure]

1. Open the sliding switch cover and check that the switc (SW1) for setting the emulator is turned to "1".
2. Select [Renesas] -> [High-performance Embedded Workshop] -> [Tools] -> [Setup tool for E10A-USB Emulator] -> [SHxxxx (H8S/xxxx) Device Group] fror [Programs] in the [Start] menu. A tool for setting up emulator is activated.

   [Notes]
   1. If the version numbers shown in (b) and (c) ar same, setup of the emulator is not required. Set emulator only when "-.--.---" is shown in (b) or the version number of (b) is older than that of (c).
   2. If the following error message is displayed, the h computer is not connected to the emulator or the switch (SW1) is turned to "0". If the setup switc (SW1) is turned to "0", set it to "1" and connect USB cable again.

3. Clicking the [Setup] button displays the following dial
4. Turn the setup switch (SW1) to "0", connect the USB again, and click the [OK] button. Setting up the emul firmware is started.

   [Notes]
   1. When [Add New Hardware Wizard] is displayed select the [Search for the best driver for your de (Recommended)] radio button and then the [S a location] check box to select the path to be se for drivers. The location must be specified as < D \ DRIVERS. (< Drive > is the CD drive letter.)
   2. When using Windows® 2000 or Windows® XP, a dialo box will be displayed to show the disconnection USB. However, this is not a problem.
   3. **Do NOT turn off the host computer or discon the USB cable while setting up the emulator. the emulator may be damaged.**

5. When the following dialog box is displayed, setting up emulator is completed.
6. When setting up the emulator has been completed, th following message will be displayed. Turn the setup s (SW1) to "1", connect the USB cable again, and click [OK] button.

[Notes]

1. **Be sure to turn the setup switch (SW1) to "1" exc when the setup tool is used.**
2. To use the license tool for another device group, it is r to set up the firmware by using the setup tool or licens that corresponds to the device group. To use the setu however, the license tool must also be installed. For d the license tool, refer to "Device Group Additions" on t menu.

After completing setting up of the E10A-USB emulator, connect it
the user target system and activate the High-performance Embedd
Workshop.

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Table of specifications

Item	Specifications
Break function:	- Hardware Break: from 2 to 10 points (differ by produc - Software Break : 255 points - Force Break
Trace function:	- Trace cycle: maximum 64K branches (differ by produ - Trace contents - Branch trace function - Memory access trace function - Data trace function (differ by products) - Filtering of display contents (Branch classify, Memory etc.) - Filtering of trace contents (Specific address/data, Fun call, etc.) - Source supplement between branch trace (differ by p
Memory access:	- Instant watch (during break) - Watch (update in execute) - RAM monitor (Read/Write) (differ by products) - Graphical display
Parallel acccess:	- Reference and change of the memory and I/O under program execution
Performance: (differ by products)	- Measure event number (available measure event num few type) - Number of Cache misses - Number of interrupt - Number of instruction fetch - Measure cycle (available measure cycle number) - Process cycle - CPU stall cycle - Function performance - Display process time for each function and func - Display each function accumulated
Host Machine (OS):	- Windows® XP - Windows® 2000
Host Machine:	- Pentium®3 600MHz or higher - Minimum RAM 128MB - Minimum 100MB free HDD - PC with USB(USB specification Rev1.1/2.0 Full speed compliant) - CD-ROM or DVD-ROM for system installation
User I/F:	- 14-way connector supplied with both types of E10A-USB to support H-UDI functions (Type: 2514-6002: [3M Co., Ltd.]) - 36-way connector HS0005KCU02H only supporting AU Trace functions (Type: DX10M-36S: [Hirose Electric Co., Ltd.]) (Use AUD function)
E10A-USB dimension	- 97mm (L) × 65mm (W) × 22mm (H)

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E10A-USB System configuration

The E10A-USB system is connected to the host in the same
via a standard USB cable (Type A to Type B 1.1 connection
which is supplied). The User Interface cable connects to the
target hardware and may vary according to whether AUD trace is
being supported or not. Please refer to the E10A-USB Product Lin
up for information on AUD trace support.

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E10A-USB emulator Target devices

HS0005KCU01H | HS0005KCU02H | HS0005KCU04H

* : When using with an MCU of SH7147 or SH7142 Group, Debug MCU Board(HS7147EDB01H) is required.

[Target system list]
In generating a new project, please refer this file to select the prope
target names for each box below.

- "Targets" box in the [Setting the Target System for Debugg Dialog Box :
- "Target" box in the [Debug Settings] Dialog Box :

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Upgrade Information

[Latest Version]

- **Released Date :** 20. Feb, 2009
- **Software name :** E10A-USB emulator software
- **Version :** V.2.14 Release 01
- **Product to Be Updated :** The emulator software for the E10A-USB emulators (HS0005KCU01H and HS0005KCU02H) V1.0.00 through V.2.14 Release 00
- **Contents**
  - Problems fixed
  Target Devices : H8SX, H8S Family
  For details, see "ToolNews"

[How to upgrade to the latest version]
Download free updates from Download site. Upgradable from any previous version.

[E10A-USB Emulator Software Component List]
For the detailed information of the software component which included in the E10A-USB emulato
software, please refer to the following PDF files.

Device group	H8SX	H8S	SH-2	SH-3	SH-Mobile	SH-4	New_SH-Mobile	SH-4A	SH-2A
Dounload									

[Target system list]
In generating a new project, please refer this file to select the proper target names for e
box below.

- "Targets" box in the [Setting the Target System for Debugging] Dialog Box :
- "Target" box in the [Debug Settings] Dialog Box :

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[Product No. of user interface cable bundled into E10A-USB emulator]

In case of corruption and loss, you can purchase user interface cables individually.

- **Product No.**

HS0005ECU01H	Optional cable to connect the E10A-USB emulator (HS0005KCU01H, HS0005KCU02H) to the 14-pin connector.
HS0005ECU02H	Optional cable to connect the E10A-USB emulator (HS0005KCU02H) to the 36-pin connector.

[User interface cable for Mictor 38pin connector]

- **Overview**

  User interface cable for Mictor 38pin connector is an optional cable to connect the E10A-USB emulator (HS0005KCU02H) to the Mictor 38pin connector 2-5767004-2 ? Tyco electronics AMP K.K.) mounted on the user system.

- **System Configuration**

  Note: The 38pin Mictor connector is also used when connecting the E200F emulator for SH7780 Series (R0E0200F2EMU00) to the user system.

- **Product No.**

HS0005ECK01H	Optional cable to connect the E10A-USB emulator (HS0005KCU02 to the Mictor 38pin connector.

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